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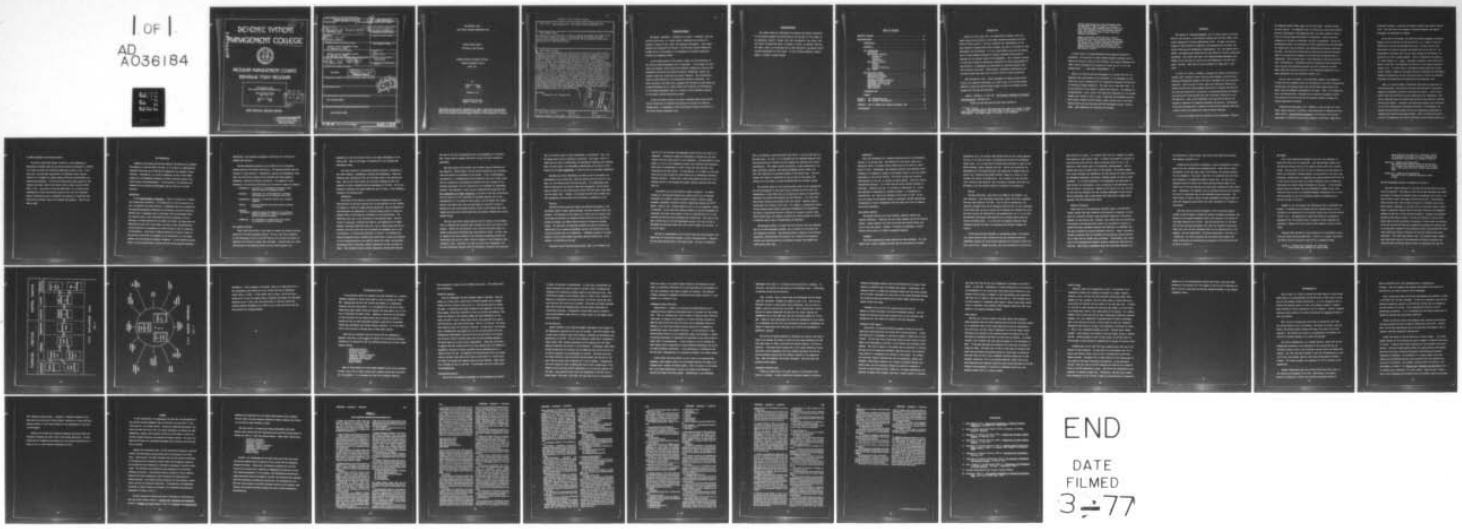

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

PROGRAM MANAGEMENT COURSE
INDIVIDUAL STUDY PROGRAM

THE CRITICAL STEP:
THE INITIAL PROGRAM MANAGEMENT PLAN

STUDY PROJECT REPORT
PMC 76-2

Ronald J. Penick
LTC USAF

FORT BELVOIR, VIRGINIA 22060

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THE CRITICAL STEP:

THE INITIAL PROGRAM MANAGEMENT PLAN

Study Project Report

Individual Study Program

Defense Systems Management College

Program Management Course

Class 76-2

by

Ronald J. Penick
LTC USAF

November 1976

Study Project Advisor
Andrew P. Mosier, DBA

DEFENSE SYSTEMS MANAGEMENT COLLEGE

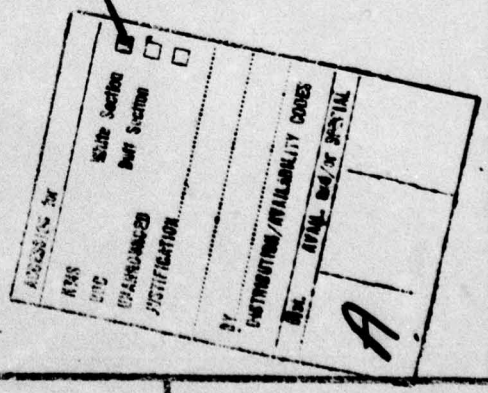
STUDY TITLE: THE CRITICAL STEP: THE INITIAL PROGRAM MANAGEMENT PLAN

STUDY PROJECT GOALS:

To examine the hypothesis that the initial Program Management Plan (PMP) is the most critical management step in a development and acquisition program; to examine the development process of the initial PMP and identify factors which de-optimize the fomulation process.

STUDY REPORT ABSTRACT:

Starting with the hypothesis that the initial project plan, to a great extent, determines the ultimate outcome of the project in terms of schedules, costs and technical performance, the author discusses the current management environment which prevails today in the military departments and the Secretary of Defense Office. Against this background the discussion continues as it develops a theoretical model for the development of the initial PMP. This model proposes that the two functions, planning and controlling, each consist of three elements; assumptions, planning, programming and scheduling, costing, resource allocations, respectively. The hierarchical dependencies of these elements are discussed in detail. Through the technique of program manager interviews, the author identifies eight factors which tend to de-optimize the process: inside-out approach, preconceived solution, 'My Plan' syndrome, inadequate threat definition, inadequate technical base, inadequate staff support, time pressure, wrong priority. Each factor is discussed in detail. Finally, six actions are recommended: education of the PM on the significance of this document, Headquarters must not issue schedules and budgets prematurely, higher authorities must stop micro managing the program based upon detailed PMPs, PM must insist adequate time, resources and priority are available, the PMP format should be at least three volumes which segregate fiscal data from general technical plans, PM must challenge the threat definition prior to issuing the PMP.



KEY WORDS

Management Plan, Program Plan

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EXECUTIVE SUMMARY

The author expresses a hypothesis, by Peter C. Sandretto, that the initial project plan, to a great extent, determines the outcome of a project in terms of time, costs, and technical performance. This report develops the background and history of the Military Program Manager philosophy and its relationship to the Department of Defense Programming, Planning and Budgeting System.

In the second section of the report a model for the formulation of the initial Program Management Plan is developed. In this model two functions are proposed, each having three elements; assumptions, planning and programming constitute the planning function; scheduling, costing and resource allocation constitute the control function. The interrelationships of these elements in the formulation process is discussed. The model discussion concludes with a proposal and rationale for publishing the Program Management Plan in three volumes and discusses the relationship of the Program Management Plan to a variety of other documents required in the weapon systems acquisition process.

In the last major section, the author discusses eight factors which tend to de-optimize the formulation process and proposes six specific changes which, if implemented, could significantly improve the quality of the intial Program Management Plan.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the patience and helpful assistance of the program managers who contributed to the contents of this study; to my classmates, Daniel J. Delany, LTC, USA, and Edward M. Lee, Major, USA, who kindly critiqued the draft; to Andrew P. Mosier, my advisor; last but not least, Cathy, who encouraged and so ably assisted in the design, drafting and finalization of this report. To all of these wonderful, helpful people, I extend a sincere thanks.

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INTRODUCTION

During the fiscal year 1977, the Department of Defense (DOD) will spend eleven billion dollars in the weapon systems development and engineering process (2:256).[1] Putting it another way, approximately 10¢ of each taxpayer's defense dollar will be spent this year in the arena of arms development and engineering. It is of little wonder then that the management of these programs continues to receive increased surveillance by Congress and the highest levels of DOD management. This increased interest is continually proded by sensational accusations of "gross mismanagement by DOD officials" in newspapers and periodicals as reporters perform their role of public watch dogs. Unfortunately, subsequent investigations far too often reveal more than just a trace of truth to these accusations.

The challenge is clear. Better management of weapon systems acquisition is an absolute requirement, not just a goal, if the United States desires to remain militarily strong enough to ensure the freedom we have enjoyed over the past two centuries.

Peter C. Sandretto, in his book, "The Economic Management of Research and Engineering," proposes that

"After all has been said and done about systems to

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[1]This notation will be used throughout the report for sources of quotations and major references. The first number is the source listed in the bibliography. The second number is the page in the reference.

> control engineering costs and performance after the decision is made to embark on a project, it is the project plan, prepared before starting the work, that determines to a major extent the outcome of a project in terms of time, costs and technical performance.
>
> Almost universally, there has been a lack of realization that once a project plan is accepted, the die is cast. Further action can help to steer the course of the project and possible conduct a rescue from diaster, but the road sign to the disaster point was erected when the project plan was written (10:68)."

A brief survey of Program Management Plans supports Sandretto's hypothesis. The opinions of todays program managers regarding the necessity and utility of this critical document, the Program Management Plan (PMP), varies throughout the continuum of "never use it" to "it's my program Bible - - - absolutely indispendable." (9)

While it is obvious that the development of a perfect PMP will not guarantee that the program will be successful, it is reasonable to conclude that a poor, incomplete PMP will guarantee unnecessary difficulties in successful program completion. Why then, are so many PMPs "bad?" It is the objective of this paper to examine that question. The approach is straightforward - first, look at the historical development of the program manager (PM) concept in DOD in order to establish the management environment; second, examine the PMP concept; third, discuss some of the major factors which tend to de-optimize the PMP development process; finally, offer some suggestions for improving the process.

BACKGROUND

The concept of "Program Management" did not simply evolve in the DOD. Quite to the contrary, it was forcibly imposed upon the very highly structured, bureaucratic military organization (8:62). By their very nature, because of their mission or objective, the Departments of the Army, Navy and Air Force must be bureaucratic organizations. Yet, the weapons development and acquisition process does not lend itself to totally bureaucratic procedures. As we shall see later, this imposed program management philosophy can be, but does not have to be, self-defeating in the PMP development process. What then is this environment and where did it come from?

In 1961, Mr. Robert S. McNamara, occupying the Office of Secretary of Defense (OSD), elected to make a bold move and attempt to structure the planning and budgeting system of the DOD in accordance with good business practices. From his point of view, there were sufficient similarities between the DOD and a large complex corporation to convince him that the DOD could and should have a continuous, interrelated planning and budgeting system which would provide long term (five year) visibility to the DOD operation. Such a set of documents would provide the OSD and the Congress a yardstick for measuring successes and failures. Furthermore, if he could implement such a system, both OSD and the Congress would have a better vehicle for making long range strategic decisions.

It was this premise then that resulted in the Programming, Planning

and Budgeting System (PPBS) which the DOD uses today. The PPBS concept is quite logical. In simplistic form, it starts with a plan which defines military deficiencies, with supporting data, and offers several alternatives for meeting these deficiencies or objectives. After review and acceptance of the plan in principle, the plan is programmed. During the programming process, the constraints of event sequencing and time schedules are imposed upon the alternatives, and preliminary alternative selections are made. The surviving alternatives are then prioritized and assigned a level of criticality with respect to how soon each alternative must be implemented. This "Program Plan" is then subjected to the final critical test - affordability. Anticipated costs are assigned to each alternative which survived the programming process and final selections are made. These items then provide the basis for the forthcoming Department of Defense submissions for the President's Budget (7:1).

Once an item is included in the President's Budget, the assumption is made that the requested items will be approved in the final Congressional Authorization and Appropriations Acts and the PPBS process starts over again, using the budgeted information as the base. Thus, in its simplistic form, the PPBS provides a mechanism for an iterative management information system with which the OSD and the Congress attempt to manage the complex Department of Defense.

Following the philosophy of Mr. McNamara, in May of 1964, Mr. Cyrus Vance, Deputy Secretary of Defense, issued Department of Defense Directive (DODD) 5010.14, System/Project Management, which directed the Military Departments to establish centralized management authorities, supported by

functional elements, to develop and acquire selected major weapon systems (6:2). With this DODD, the concept of Program Management was applied throughout the Department of Defense.

By the end of the decade, the PPBS and Program Management procedures became a fact of life for the OSD and the DOD. As a result of this new visibility at the OSD and Congressional level, it became obvious that there were still serious problems associated with the way the DOD and Departments of the Army, Navy and Air Force managed the development and acquisition of their weapons systems. After a comprehensive evaluation, Mr. David Packard, the Deputy Secretary of Defense, issued DODD 5000.1, dated 13 July 1971, and redefined the OSD role in the program management process (4:2). A review council, the Defense System Acquisition Review Council (DSARC), headed by the Deputy Director of Research and Development (DDR&D) was proposed as the OSD controlling body to review and recommend initiation and termination of individual service programs (5:2).

Thus, in a single decade, considerably less than one generation of military personnel, the services had twice been directed to drastically change the traditional methods of operation and control. Each of these actions made the individual military departments less independent, less able to determine their own destiny and subject to more and more external scrutiny and control. Confusion, resistance and mistakes were inevitable as the "new" organizations developed and matured. Unfortunately, the effects of such drastic changes are not yet universally recognized nor accepted with tolerance and understanding. Thus, criticism and accusations of "incompetency" are just as inevitable as the mistakes which will

be made throughout the maturing process.

The PM of today finds himself involved in a new organization, drastically different from the one he was trained and educated in, subject to a level of review and visibility heretofore unknown to him. At the same time, this military organization is undergoing severe internal turmoil as it attempts to rapidly change traditions, methodologies and ingrained philosophies. The trend to decentralize major aspects of OSD control continues to add to the turmoil with a recent rewrite of DODD 5000.1 (3:2). The thrust of this new DODD 5000.1 is to allocate more implementation review and control authority back into the individual Service organizations and to strengthen the position of individual PMs. Within this environment then, let's examine the question - "Why are the PMPs so bad?"

PMP FORMULATION

Before we can analyze the PMP and identify the factors which address the question of why some PMP's are bad, it is critical to understand the functions which make up the PMP and to understand the elements of each function. Furthermore, it is just as essential to have a full understanding of the dependency hierarchy of these functional elements and their various interrelationships. In this section, the functions and elements will be defined and discussed, and the utility of the PMP surveyed.

DEFINITIONS

In the Merriam-Webster Dictionary, a "plan" is defined as "a method for accomplishing something." This definition is far too broad for our use, but applying the same principle, a management plan can be defined as the proposed management methodology for attaining a given end objective. Assuming that a management plan is developed under circumstances where the starting base is well established and fully understood, the end objective is firmly defined with no chance for change, and experience has identified the best way to get there, the plan is very straightforward. Little difficulty is encountered in either writing it down or executing it successfully. Since none of these conditions are likely to exist at the time an initial PMP is required for the acquisition of a new weapon system, even this definition appears inadequate. In this specific context then, it is more appropriate to define the PMP as the proposed management

methodology, with proposed contingency alternatives for attaining an assumed end objective.

The PMP development process can be divided into two functions; program planning and program controlling. The program planning function consists of three elements - assumptions, planning and programming, likewise, the controlling function can be divided into three elements - scheduling, costing and resource allocation. For purposes of this discussion, the following definitions will be used for these six elements,

- . assumptions - uncertain or nonvalidated information which form the basis of subsequent action.
- . planning - identifying all actions required to proceed from where you are to where you wish to be.
- . programming - ordering all required actions into a logical sequence.
- . costing - cost of completing any given action or series of actions.
- . resource allocation - allocating money and manpower to an action or series of actions in order to implement that action or series of actions.
- . scheduling - the assignment of quantitative time values to an action or series of actions.

THE PLANNING FUNCTION

Using these definitions, we are ready to examine the program planning function of the PMP development process. We will limit this discussion to the development of the initial PMP and will not include the process of updating a PMP which has already been developed. Although there are close similarities to the updating process and the initial process, the

hypothesis is that the critical step is the proper development of the initial PMP. That is the center of attention for the following PMP development model.

The first function is the program planning function, consisting of the three elements - assumptions, planning and programming. There are obviously many assumptions which are routinely made in any planning process. Here we will only discuss the two major assumptions which are required in order to proceed with the development of the PMP. One is the assumption regarding the threat definition and the other is the assumption regarding the technical base.

Assumptions

The nature of the threat is the most basic assumption because the definitization of any plan requires that an end objective be well defined. In context of a PMP for a weapon system acquisition, the end objective is the development and deployment of a specific weapon system to negate an assumed threat to the security and defense of the United States. The difficulty here lies in the definition of the assumed threat. The difficulty of precisely defining the kinds of, and capabilities of weapon systems a potential enemy will have five, ten or twenty years from now is enormous, but even given that you can predict the equipment part of the war machinery, it is even more difficult to forecast the strategic and technical approach that an assumed enemy would take in using such weaponry. It is not surprising then, when asked to define the threat, the potential user responds with a very hazy, sketchy description of what he thinks he wants. Such documents usually contain appropriate caveats which absolve

the user of the final responsibility for the development of an end product, which could be useless when built to meet the user's stated requirements.

How then should the PM resolve this critical issue of defining his end objective? Stated simply, the new PM must develop his set of assumptions and define his perception of the threat. If he is knowledgeable and persistant, a representative of the potential user will finally agree that his assumptions and perception represent the best estimate of the forecast requirement and will coordinate on the statement of requirement document. What this says is that the user representative agrees that the PM's assumptions and threat definition is as good as the user could define. With the signing of this memorandum of agreement between the PM and a representative of the potential using agency, the PM accepts full responsibility for making sure that the end product he initially intends to develop will meet this assumed military threat at some future date, even though the threat which materializes may only vaguely resemble the initial assumed threat.

The next area which usually requires the PM to make a set of assumptions is defining the technical base available to him at the start of the program. Unlike the end objective, here, the PM is far more likely to assume a more mature technology base than actually exists. In part, this is caused by the total absence of any individual organization which can objectively give the PM a clear, factual statement of the technology base available to him. Therefore, in order to obtain this information, the PM must communicate directly with the development scientists and engineers

who, by the very nature of their professions, are optimists. Thus, the PM always starts with an optimistic evaluation. Once again, the PM is faced with the task of establishing his assumptions regarding the technical base, and once again, the development organizations are willing to coordinate with the PM's assumptions, as long as they are reasonably optimistic.

Although many other assumptions are made by the PM throughout the development of the initial PMP, these two provide the very basis for the plan, ie, the starting point and the end point. By understanding that both of these points are heavily based upon assumptions, the PM should have an insight as to why and how this initial PMP has such a high potential for being "bad." However, just because the PMP must be based upon such assumptions does not mean that the program is destined to fail.

Planning

Once the technical base and threat are defined and agreed to, and the general type of weapon system defined, the major planning effort can proceed. The objective of this phase is to start with the assumed technical base and identify all possible actions which will be required to develop and deploy the weapon system destined to negate the assumed threat. Not only must all technical problems and solution actions be identified, but all possible management actions and alternatives which could be utilized need to be identified. Inadequate attention to either portion of this process almost guarantees serious difficulties, if not failure, in execution of the plan.

The first step of this planning process, then, is to identify and

list all of the technical and management actions which will need to be addressed. Alternatives should be identified to provide for the eventuality that any single action is not successful. The end product of this phase is a list of all reasonable actions, both technical and managerial, which must be accomplished in order to meet the end objective, with alternatives for each action. In this process, it is common to find that there may be some actions for which there are no reasonable alternative actions available. Clearly then, these items become critical go, no go decision points in the program and require special attention from this point on.

The nature of this list should be nearly exhaustive. It should include all anticipated documentation efforts which will be required throughout the program, discrete technical efforts, testing, safety programs, deployment transition efforts, supporting research and development efforts, etc., without regard to how it will be sequenced, funded or executed. By the time this planning element of the PMP development is completed, the scope of the effort as well as identification of all the required actions have been considered and written down. This step is the most critical part of the PMP development process, for once the PMP is developed and published there will be no time to repeat this process. It is now or never!

Now that a comprehensive list of action items has been developed, the second part of the planning process is fairly straightforward - identifying who could perform each of the action items. One way to accomplish

this is to develop a matrix structure with "what" on one axis and "who" on the other axis. By "who," it is intended that all proposed agencies which could potentially be involved with the program are identified for initial consideration. This should include contractors, either generically or by name, government agencies, the program management office itself, etc. This list identifies all possible members of the program team. Once the "whats" and "whos" are identified on the two axis of the matrix, the filling in of the matrix is quite straightforward and proceeds rapidly.

The critical nature of this planning phase cannot be over emphasized, for the thoroughness of this final matrix provides the total basis for establishing a viable PMP which will maximize the chances of successfully completing the program and reaching the end objective. It is here that most poorly conceived and written plans have failed. Numerous opportunities exist for failing at this time. For example, a preconceived notion of how and what almost always eliminates consideration of alternatives. The lack of alternatives results in failure to recognize critical items which require early and constant attention and usually results in failure to identify better ways of accomplishing the objective.

The planning element is clearly the most critical and time consuming part of the PMP development process, for it creates the very basis for all subsequent decisions. The planning element, consists of two discrete operations; identification and listing of all technical and managerial actions, and identification of all potential program team members who could perform each item.

Programming

After the development of a complete planning matrix, the programming function is relatively easy. The resorting of the action items into a sequential format is normally fairly obvious and can be done in a short period of time. Nonetheless, this process requires close attention since frequently the sequence of events is the primary factor in the next effort: development of the control tactics. By tactics we mean the tentative identification of who can, or should, do which efforts. This will require considerable attention. It is here that the first business strategy is developed. Questions such as: a) in-house or contractual? b) one or more agencies in competition or parallel efforts? c) development of alternatives? etc. need to be answered at this point in time. By the time this phase of the program concept is developed, the PMP architecture is beginning to take a recognizable form and ready for the PM to develop the control functions.

THE CONTROL FUNCTION

The control function has three elements, schedule, costing and resource allocation. These are the only three elements the PM can directly control - money, manpower and time, and he has only minimal direct control of the time element. However, scheduling is considered a control function since time is a visible, measurable quantity.

Schedule

The first quantitative values required are time estimates. For each action item a time to complete estimate must be developed and assigned.

Although by now it has usually been decided what the most likely approach will be, it is still too early to eliminate the options and contingency action items. All of these must be objectively evaluated in terms of the control elements, money, manpower and time. Having time quantified the programmed plan (the sequenced plan) the format may be changed from the matrix into a detailed time phased network, simply as a matter of convenience and clarity of presentation. Now it begins to look very much like a decision tree skeleton, and is becoming a document from which the PM begins to do some serious objective evaluation of alternatives.

Costing

The next quantities which need to be added to the schedule are cost estimates. Cost estimating undoubtedly causes the PM more headaches than any other element of the PMP. Most of that is generated by the emotional prejudice that the PM associates with the art of cost estimating. On the other hand, he has no choice but to develop cost estimates for each and every action item identified in the proposed plan, for it is the cost and schedule information which permits him to further select among the various alternate paths. It is the cost and schedule estimates which ultimately provide the basis for proposing the business strategy and tactics.

If the plan has been developed in considerable detail, the individual action items are well defined and the cost estimates should be reasonably accurate for those actions scheduled for completion within the first year or two. Beyond two years, the cost estimates will be more and

more difficult to obtain. As a result there will be a tendency to assign wild guesses to these action items. In today's environment of pressure to use life cycle costs and unit costs as decision points for go, no go decisions, these always tend to be enormously underestimated. This is another sign post to trouble later in the program. The prudent manager will clearly document his assumptions and data sources for these estimates, be reasonably pessimistic and assign a probable margin of error to these estimates. It is almost impossible to overemphasize the importance of this initial cost estimating, or the criticality of the data base in the PMP from which it was derived. Whether the PM likes it or not, the fact is that once the schedules and cost estimates developed in this initial PMP are published, these values become firm input data to higher headquarters, DOD and Congressional plans.

Resource Allocation

Given that all of the previously described steps in the PMP development process have been carefully and successfully completed, the next step is to allocate in-house, other government agencies or contractual manpower to each action item. Normally, this starts with the structuring and sizing of the program office itself, for the amount of support required from other government agencies and contractors is dependent upon how self contained the program management office is. Again, alternative sources of manpower must be considered and contingency actions provided for if they have not already been considered. Nevertheless, each action item is now considered and manpower resource allocations identified for each one. When there is reasonable doubt that government manpower will

be available for a given action, that action item should have contractual manpower assigned to it.

Following the allocation of manpower, it may be necessary to iterate some of the cost estimating of selected actions. Since this is almost unavoidable at the very early time of the program, the PM must exercise his own judgement in this area. Once the PM is satisfied with the final cost estimates, the budgeting process is quite easy. By this time, a preferred series of actions are visible and the primary budget is the simple sum of the cost estimates for each action scheduled for each fiscal year. Furthermore, the expected cost of alternative actions are available for the PM to negotiate from as the budgeting process continues. The final budget, of course, should include reasonsable contingency funds to cover the unexpected events which will occur throughout the lifetime of the program.

The real value of the PMP developed in this way becomes quickly evident as the PM begins to defend his program management philosophy, the manning of his program management office, the submission and defense of his budget requests and so forth. This PMP provides most of the input data for his Advanced Procurement Plan (APP) and Decision Coordinating Paper (DCP) and the other documents which are all required early in the program. But most importantly, the PM has established a firm basis of credibility for future dealings with the program team members and higher authorities by documenting his perception of the problem and how he plans to solve it.

PMP FORMAT

One of the authorities delegated to the PM is the authority to decide the format of his program PMP. Most PMP documents combine both the planning function data and the control function data into a single volume. The net result of this is that it restricts the distribution to within the government, thereby keeping a large portion of the total team uninformed. Specifically, by combining the planning function data with all of the control function data, the entire industrial base is prohibited from seeing the overall scope and details of the plan. If the planning function data and schedule data were published as single volume, this could not only be given to interested potential contractors but it would even be possible to ask for contractual support in developing this critical portion of the PMP.

Whether or not the manpower and organization data is published separately or combined with the budget and cost estimate data is not as critical as the separation of the planning function data from the control function data. The separation of these data should be considered as appropriate for each program after an estimate is made regarding the frequency of update and total volume of data required in each of these areas.

Assuming that the PMP of a given program will be published in more than one volume and using AFSCP 800-3 (1:A4-1), as a model, the following topics could be assigned to each of three proposed volumes.

Volume I - Program Plan, Schedules and Milestones.
This volume should address all topics except

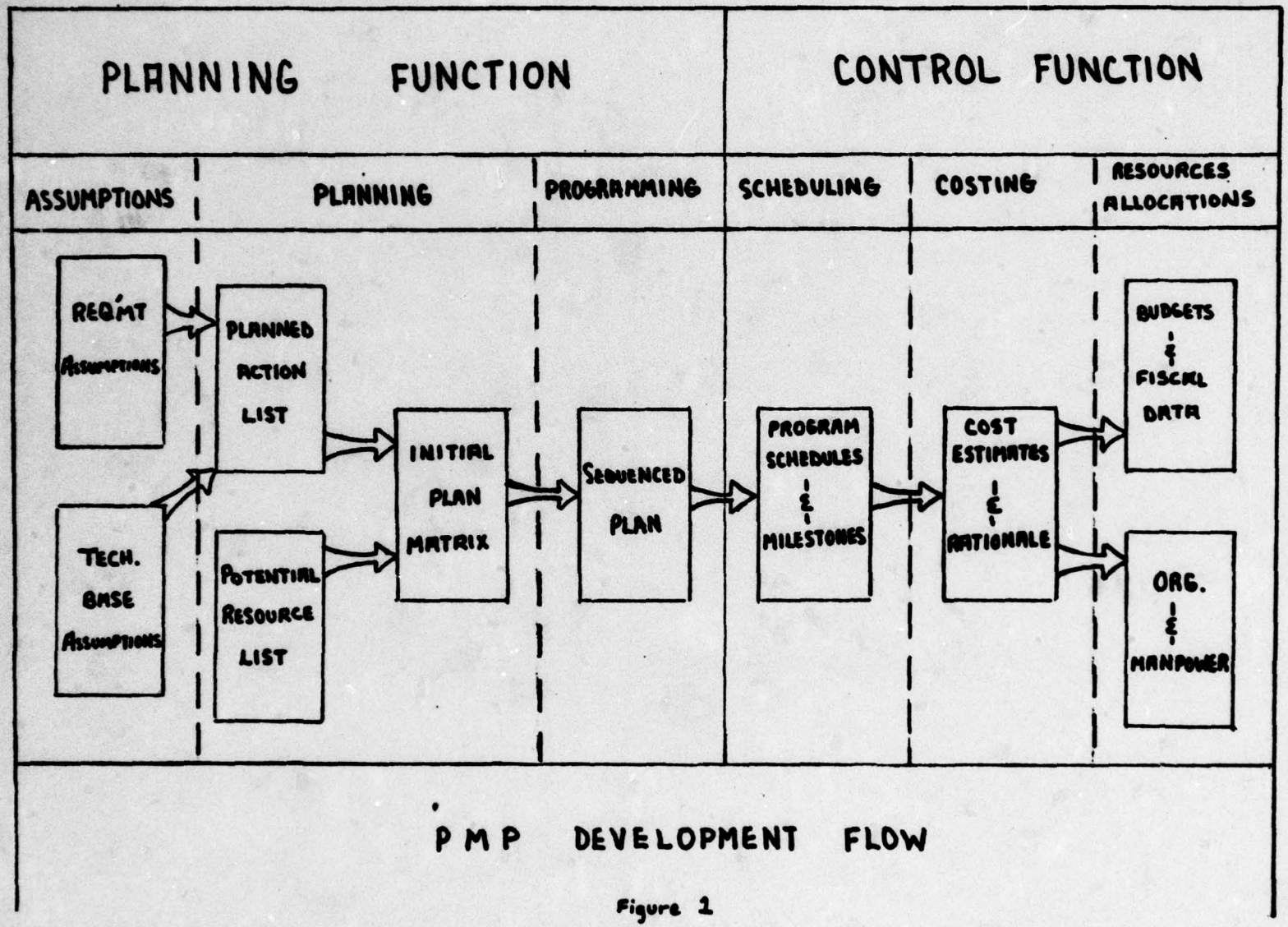
those identified in Section 3e, Financial; Section 3f, Procurement Strategy; Section 11, Manpower and Organization; and Section 12, Personnel Training.

Volume II - Budgets and Fiscal Plans
This volume should address Section 3e and Section 3f, including the detailed rationale for the fiscal data. This volume would also include cost estimate date.

Volume III - Manpower and Organization
Sections 11 and 12 should be detailed in this volume.

The PMP development process is summarized in Figure 1.

The next logical question is "why must the initial PMP be so extensive and detailed?" The answer is that the PM must understand the nature and number of subsequent documents which are dependent upon the PMP. We have alluded to some, the budget, the APP and the DCP. Unfortunately there are many more, some of which are part of a document chain having broad impacts, especially if the PMP is for a large major weapon system. Figure 2 graphically depicts some of the major documents and subsequent impacts the PMP has on other planning documents. Although the dependent documents identified in Figure 2 are not all inclusive of the various places where the PMP information is required, it does answer the question of why the initial PMP must be as extensive and precise as possible when it is published. Changes to the information within the published PMP often cause significant impacts throughout the DOD and Congressional fiscal committees. When these type changes occur, the program manager spends a very significant amount of time answering the flood of questions and criticism from the various agencies which are dependent upon that PMP


PLANNING FUNCTION
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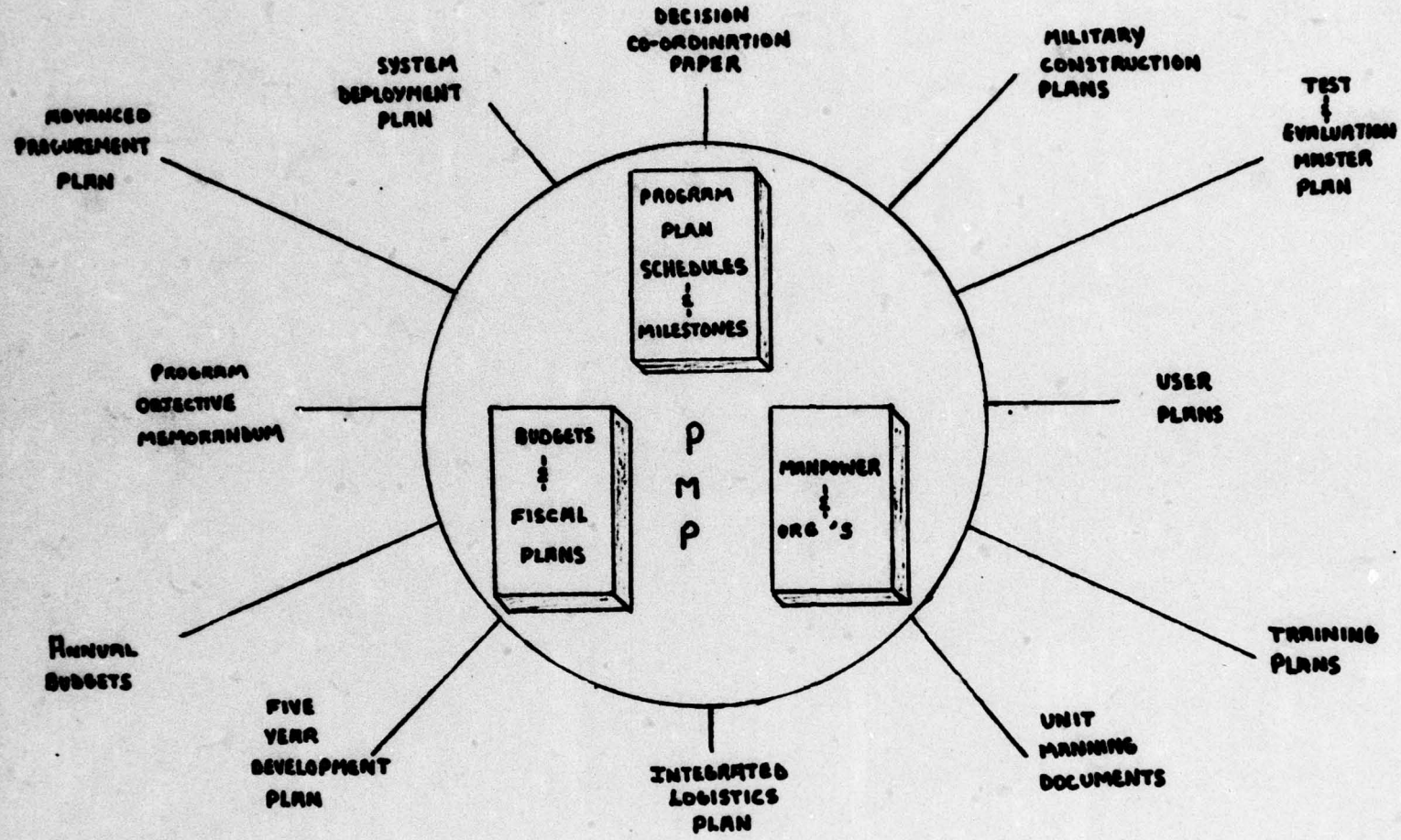
REQ'MT ASSUMPTIONS
TECH. BASE ASSUMPTIONS
PLANNED ACTION LIST
POTENTIAL RESOURCE LIST
INITIAL PLAN MATRIX
SEQUENCED PLAN
PROGRAM SCHEDULES & MILESTONES
COST ESTIMATES & RATIONALE
BUDGETS & FISCAL DATA
ORG. & MANPOWER
PMP DEVELOPMENT FLOW

Figure 1



P M P DOCUMENT DEPENDENCIES

Figure 2

information. Once a program is initiated, there is no doubt that all of the information which should be in the initial PMP will be addressed - either sooner or later. If the chosen time is later, the PM will pay a severe price in time by simply trying to research and answer the inevitable questions one at a time. Yes, the initial PMP is critical and has far reaching effects throughout all of DOD, so do it right the first time and help yourself Mr. Program Manager.

DE-OPTIMIZING FACTORS

In the previous section an argument has been developed for a logical, extensive sequence of events which need to occur to produce the "ideal" PMP. Recognizing that the real working environment is a significant deviation from the ideal model, it is as important for the PM to understand those major factors which work against the ideal model as it is for him to understand the model itself. Hopefully, the PM who has knowledge of both the model and the factors which tend to resist his efforts to produce his PMP can make reasonable conscious trade offs in the process rather than proceeding into trouble through ignorance. It is the objective of this section to discuss some of these major factors.

Faced with an accusation that the initial PMP was inadequately prepared, PMs offer a wide variety of reasons for the deficient document. Although not an exhaustive list, the following factors are the most common reasons offered.

- Inside-Out Approach
- Preconceived Solution
- "My Plan" Syndrome
- Inadequate Threat Definition
- Inadequate Technical Base
- Inadequate Staff Support
- Time Pressure
- Wrong Priority

Many of these factors are often found combined in any given situation. In fact, any or all of these factors may be present during the initiation of a new program. It is necessary for the PM to recognize them and

have techniques to cope with the problems they cause. Lets examine each one individually.

Inside-Out Approach

This is undoubtedly the most frequent cause of bad PMPs. This procedure is to start with a given set of control elements and an assumed threat and try to build a plan to fit it. The starting point is always the same - a directive from higher authority which appoints a PM or task force leader, gives him a directive to set up an office and develop a PMP which will deliver a new military widget for field deployment in five years. The PMP is due in ninety days and you are authorized five people and $250,000 for this first fiscal year. And "Oh, by the way," the total cost should be about "n" millions of dollars. At this point, the PM goes back to Headquarters and pleads his case for not being able to do that. Headquarters acknowledges that may be true but wants him to try anyway. The military "can-do" attitude takes over and the PM mashes together a PMP which meets all of the initial requirements. Since only the PM has to approve the PMP, he does not have to tell anybody that the schedule is impossible, the plan is poorly conceived and the estimated cost is a factor of four too low. He complied with the directive and he can always correct the plan later when he has time to think about it a little more. No wonder the program has schedule slips and cost overruns. There never was a bottoms up look at this PMP. It was doomed with the initial edict from Headquarters.

Preconceived Solution

One of the most dangerous approaches to the development of the PMP

is where the solution is preconceived. In this case, alternatives are rarely developed and since the path is already "known," schedules and resources will invariably be badly biased on the optimistic side. When difficulties develop in the program, there is either a mad scramble to develop an alternative fix or more likely, the PM will insist that with more resources and time he will overcome. Such plans are always premised upon 100% success and decision points are not easily identified nor objectively evaluated. Preconceived solution PMPs must be avoided if cost and performance trade offs are a viable tenant of the weapons acquisition business.

My Plan Syndrome

Deeply imbedded in the "Program Manager" philosophy is the charter of PM independence regarding how he runs his program. Some PMs interpret this to mean total autonomy within their program, including the development and publication of the PMP. The Air Force guidance, AFSCP 800-3, Attachment 4, dated 9 April 1976, further encourages this by implying that the final approval authority for the PMP is the PM himself. Furthermore, AFSCP 800-3 clearly states that its contents are not directive upon the PM but are to be used as guidance in the development of the PMP. Fortified with this new found authority, some PMs develop the philosophy that the PMP is "my plan" and its nobody else's business how I run my program. Subsequently, the PM is forced at least to demonstrate that he has a master plan, so he submits a plan with only enough information in it to get the inquirer off his back. When queried further about the skimpiness of the PMP, the PM often replys, "The less I tell them, the less they try to run my program."

While his intent is to prevent higher authority from managing his program, by witholding information he is also depriving his team members of the very information they need to support his program. This approach creates unnecessary management difficulties and usually results in a poor product or no product at all.

Inadequate Threat Definition

Theoretically, a threat is a logically concluded definition of a proposed military capability deficiency which is forecast for some future date. That is, starting with a set of facts of today and some historical trend data, an analysis and forecast of a future military situation is made for some finite time into the future and an assessment made as to whether or not the United States Military forces will be adequate to successfully negate the proposed situation. If the conclusion is that United States forces will not successfully negate the situation, a threat or military deficiency is documented and presented to the Joint Chiefs of Staff (JCS) for consideration. In this process it is not uncommon for each analyst and/or organization to make different assumptions and arrive at vastly different conclusions. If the deficiency is validated by the JCS the usual recommendation is to develop and deploy a new weapon system.

A more likely situation however is for a case to be presented that suggests a given weapon system is or has become obsolete and needs to be replaced with a bigger and better system. This, of course, is the signal for a new system proponents to cause a new threat to be defined to justify the bigger and better system. Occasionally, a new technology

development will result in a solution and go looking for a problem. In this case, the results are the same as the obsolescent case - a deficiency is defined to meet the new solution.

Well, so what? Does it really make any differences how the threat study got initiated? Probably the answer to that is no. From the new PMs point of view it really makes little difference, until he tries to define a plan for solving this new threat. Now it becomes most critical for him to clearly understand the basis for the threat analysis and assumptions for he must make sure that his new weapon system will do the job. Unless he fully understands the facts and assumptions of this threat, it is impossible for him to do any contingency planning to accommodate the change in threat which will inevitably occur during the development to deployment lifetime.

The new PM is usually hesitant to challenge the threat at this early stage so he assumes the threat is valid and sets about developing his PMP with great haste in order to get this new program underway "as soon as possible." The minute this PM signs off on this threat definition he has just made a basic assumption which now becomes associated with him and not the analysis organization who suddenly retreats to the supportive role. When this happens, the PM has just passed the first road sign pointed toward trouble.

Inadequate Technical Base

Rarely are errors about the actual status of the technical base fatal to a program. In most cases the PM suddenly inherits a much more

extensive development program than he anticipated with the usual consequences of schedule slips and program cost growth. Occasionally, the technical base is so badly over estimated though that the entire program must be either terminated at a later date or the system developed through the validation phase and shelved since another weapon system has been chosen to meet the threat.

Technical risk is one of the problem areas that the PM expects to handle throughout the entire development process. But the manager who develops a plan with serious errors in his technical base assumptions has just asked for trouble at the very beginning.

Inadequate Staff Support

Quite often, the proposed program management office has not been officially established when the initial PMP is being developed. A small task force and a PM designee or task force leader is tasked with writing the PMP. If this task force insists upon being the sole source of knowledge in the development of the PMP, it will suffer from inadequate staff support. The team in charge of this effort has an obligation to identify and use all of the expertise available, and particularly those organizations which will subsequently be involved in the program. For example, all functional support organizations such as engineering, safety, procurement, intelligence agencies, user command, personnel manpower evaluation teams, and even potential contractors should be requested or directed to help develop the PMP. After all, if these organizations are required to support this program, they have a vested interest in ensuring

that goes well and are more than academically interested in the development of this PMP. Furthermore, if these organizations are involved in the development of the initial plan they become quite committed to the program and will begin to support it with considerably more enthusiasm than they will if asked to join the team later on. PMP documents which are bad because of "inadequate staff support" should cause higher authorities to reconsider very carefully before keeping these same task force people in the program management office.

Time Pressure

From day one, the PM is going to be under severe time pressures. These pressures come from every direction and are almost invariably caused by an assumption made in the threat definition which has established a very arbitrary, but firm, date of deployment of this new weapon system. The typical PM responds to this urgency pressure by reducing the time allocated for developing the PMP to as near zero as possible. He always intends to do it better next time when he updates it, but the damage is done. It has been published and accepted as his best plan the minute it leaves his desk. The worst part of this is that while he thinks he has saved time and gotten the program started in record time, he finds out very soon that not only is the inadequate planning causing him to have frequent "surprises," but he is actually spending a great deal of his time researching and answering questions which should have been in the PMP. Although time management is viewed as an admirable virtue for a PM, cheating himself here is a costly mistake.

Wrong Prioity

Normally, when a PM is appointed to start a new program, he is immediately flooded with a deluge of requests for budget, manpower requests, plans, and even the first Decision Coordinating Paper (DCP). Amongst all this confusion, the PM is very likely to assign work priorities which will satisfy the most people in the very near term. In doing so, the PMP is often assigned far less than the number 1 priority which it so desperately needs in this early phase of the program. As a result, budgets, both current year and out year, organization decisions, manpower requests, etc, are "temporarily" submitted while the PMP is developed. Much to the surprise of the PM, he soon finds out that the "temporary" submissions have shown up in many of the documents illustrated in Figure 2. Thus, a new, unexpected problem now exist - getting those numbers changed - which requires the talents of the very people trying to develop the PMP. Finding himself in this vicious circle, the PM may never recover enough to fully develop an adequate PMP no matter how hard he tries.

Probably most of the "bad" PMPs were caused by more than one of the factors we have discussed. In some there is a good chance that all of these, plus several others, were at work to de-optimize the PMP development process. Throughout all of these factors is the intertwining of the single PM and matrix management philosophies. As was mentioned earlier, these can tend to be self-defeating but need not be a negative force in the PMP development process. The PM has the responsibility and authority to develop a proper PMP. Furthermore, through matrix management techniques, he has available almost an infinite amount of expertise.

Despite all of the de-optimizing factors which exist, with some understanding of the process and a few changes in the way the PM develops the PMP, it can be a good plan and the most valuable document in the program management office.

RECOMMENDATIONS

Just as there is a truth in lending law today there is a very strong trend today at the Congressional and the OSD level to have truth in planning for new weapons systems acquisitions. It is an interesting fact to notice that Congress rarely, if ever, has refused to approve a program start because of initial estimates of cost or schedule. However, Congress routinely kills programs for severly overrunning the initial estimates of cost and schedule.

Well, how do we reverse this trend then of publishing "bad" PMPs, the initial source of all of this data? The answer is neither clear nor simple, but several simple changes could make a big step in the right direction. The results will neither be instantaneous nor dramatic, but failure to consider changing is to ignore the problem.

The first recommendation is to educate the PMs, future PMs and key Headquarters personnel in the importance of the initial PMP and the tremendous impact it has on all subsequent actions which will effect this program. For those few major programs it may even be appropriate to have the PM hear that message loud and clear from the Secretary of Defense himself. For lesser programs, the signatory of the PM's charter may be appropriate.

Second, Headquarters must stop issuing directives which result in the inside-out development of the PMP. Specifically, the control factors of scheduling, costing, and resource allocation should not

even be considered until the programmed plan is completed and reviewed. When the proposed team members have approved this portion of the PMP then the control function can be developed.

Third, authorities above the PM must stop managing the program in order to eliminate the "My Plan" syndrome. If the PM is expected to provide the detailed information required in the PMP then he must have the freedom to use the document in his way. To do otherwise will result in the PM withholding information. If it is necessary for the higher authorities to manage the program then they should change PMs.

Fourth, the PM must insist that adequate time, priority and resources are made available for him to properly develop the initial PMP. Furthermore, the PM must make maximum use of all potential team members, and resources, including industrial organizations.

Fifth, the format of the PMP should be in three volumes. One volume should contain all the rationale and data to support a scheduled plan-start to finish. A second volume should address only cost estimates and fiscal matters. The third volume should address the organizational and manpower portion of the plan, including interagency relationships and planned memoranda of agreement. By publishing it in three volumes, each team member can be provided with only those portions which are necessary for his part of the effort. For example, industry could be involved in the development of Volume I, the Program Plan, Schedules and Milestones since no critical cost information is in that volume. There is even a chance that a more reasonable and attainable plan and schedule could be developed

with industrial participation. Hopefully, industrial members of the team would also plan their efforts better, resulting in a more efficient program overall, if they were involved in the development of this part of the program.

Finally the PM must quit blatantly accepting the given threat and seriously challenge the user's view of the threat definition. He must understand the assumptions and reality of the military deficiency he is going to try to solve before he develops his plan.

SUMMARY

In the introduction, the hypothesis was made that the development of the initial Program Management Plan is the most critical effort in the life cycle of a new weapon system. During the background discussion, the point was made that since 1961, the entire Department of Defense has been undergoing a radical and traumatic evolution in the manner in which the military complex develops and acquires new weapon systems. The point was made that mistakes are inevitable throughout this evolution and criticism will be severe.

Against this background then, the PMP formulation discussion centered around a PMP development process model which is analogous to the PPBS logic. Specifically, the model proposes that the PMP should be developed in discrete and finite operations which permit each subsequent operation to be based upon the composite of information developed in previous operations. The PMP model was defined as being composed of two functions, planning and control. The planning function consists of three elements, defining the basic assumptions, option planning and programming the planned options. The control function consists of three elements, scheduling, costing and resource allocations. The sequential and dependency hierarchy of these functions and elements are discussed and graphically displayed in Figures 1 and 2.

The PMP formulation section ends with a discussion of formating the PMP into three volumes; Volume I, Program Plan, Schedules and Milestones; Volume II, Budgets and Fiscal Plans; Volume III, Manpower and Organizations.

Arguments are presented for this format which propose that increased utility within the participating industrial complex requires that Volume I of the PMP be made available to them.

The next section, De-Optimizing Factors, discussed eight major factors which current PMs have experienced which provide strong forces to develop the PMP in a less than optimum manner. These eight factors were

- Inside-Out Approach
- Preconceived Solution
- "My Plan" Syndrome
- Inadequate Threat Definition
- Inadequate Technical Base
- Inadequate Staff Support
- Time Pressure
- Wrong Priority

Finally, six recommendations are made which could have long range and lasting impacts upon the quality of the initial PMP and subsequent program efficiency. These were, PM education regarding the critical nature of the initial PMP, cessation of Headquarters dictating the control factors prematurely in the program, less Headquarters program managing based upon details disclosed in the PMP, PM insistance upon adequate time and resources to develop the initial PMP, the reformating of the PMP into three volumes to provide increased utility of the document, and finally, the PM must seriously critique the user's threat assumptions and definition.

APPENDIX I

HOW TO PREPARE THE PROGRAM MANAGEMENT PLAN

1. Criteria. This attachment provides criteria that should be considered for each section of the PMP. The material presented is for information and guidance and is not directive. The Program Manager should issue specific instructions and format. A section distribution list should be made if different from the PMP master distribution list.

2. Program Summary and Authorization (Section 1).

a. Briefly describe the system/equipment and the acquisition/management approach as required to ensure participating organizations and management officials understand the key features of the program. It should also summarize the research and development background and the rationale for the equipment/system selected (reference the Development Concept Paper if applicable).

b. Include a summary or reference to latest issues of program directive documents (PMDs, AFSC Form 56, and so forth) that establish program parameters, identify resources, and otherwise govern the continued actions of participating organizations. It will also include the importance category, precedence rating, and program priority, if assigned.

3. Intelligence (Section 2). The product division intelligence office is responsible for providing a single point of contact for intelligence information and support to the PO. The content of this section should be limited to:

a. Identification of the Threat. This part should consist of a listing of all threats relevant to the program. It should only include sufficient data to properly identify each threat system; it should not include a narrative or descriptive information such as performance parameters and system characteristics.

b. Identification of Relevant Foreign Technologies. This part should list categories of technologies that are significant to the program; it should be very brief. The purpose is to identify those categories of foreign technology data which may prove to be valuable.

c. Documentation of Intelligence Requirements. This part should define the level of detail and kind of data required on those threat systems/technology categories identified in parts a and b. It should also define specific or unusual intelligence support which may be required, such as: full-time intelligence officer support from the local intelligence office; threat working group support; special studies support and threat scenario requirements.

d. Reference Intelligence Documents. This part should reference DIA, FTD, using command, or other intelligence documents that supply data *critical to the program efforts*, and reference documents which *impact threat identification*.

e. Threat packages or summaries should be published separate from the PMP.

4. Program Management (Section 3). This section should provide a description of the overall management concept and approach, in somewhat more detail than that in section 1, which will be used to meet the requirements of the program. The methods employed will ensure sufficient real-time visibility concerning contractor effort to allow a continuous assessment of program progress and technical performance, schedule and costs; that is, an integrated management information system tailored to program office and contractor needs. The following major subsections should be addressed for each program:

a. Technical Performance. Develop a management approach that will provide for continuous assessment of program accomplishments versus stated requirements.

b. Schedules. Participating organizations should assist in preparing AFSC Forms 103, Program Schedule, to show a master schedule of major milestones, key events, and any critical actions essential to timely execution of the program. Detailed schedules should also be included in this section such as:

(1) Master Program/Overall Milestone Schedule
(2) Production/Delivery Schedules.
(3) Facilities and Site Activation Schedules.
(4) Action Schedules.
(5) Test Schedules.
(6) Training Schedules.

The Program Manager should ensure that the scheduled activities of participating organizations are compatible and consistent with the program schedules.

c. Interrelationships. Define the interrelationship of major commands and other Government and non-Government organizations that will provide major support to the program. Reference should be made to written agreements with participating organizations. Describe the use of any independent assessment teams at selected key milestones in the program. Include interrelationships among or between AFSC field commands and laboratories.

d. Reporting Requirements. Identify reports to be submitted to meet the requirements of higher headquarters and other participating commands, including

a cross-reference with the applicable directive. Also, indicate whether contractor inputs will be required.

e. Financial. Include a summary of the total costs of the program including costs of acquisition, logistic support, related military construction and operation by the operating command. The Program Manager is responsible for the overall development, collection, analysis, and presentation of financial data for a PMP. The participating and support commands are the source of financial estimates for their areas of responsibility, and normally furnish the program office cost data and information on the methods, techniques, and factors used in developing their estimates. Summaries should be in tabular format including prior fiscal years, current fiscal year, 5 succeeding fiscal years, and to completion. Summary data should be shown for the following appropriations as applicable:

3010–Aircraft Procurement
3020–Missile Procurement
3080–Other Procurement
3300–Military Construction
3400–Operations and Maintenance
3600–RDT&E

Separate entries should be made under each appropriation to identify the amounts to be budgeted and managed by the various participating commands. For example, in 3010, an AFSC and an AFLC amount would normally be shown. Entries should be at the Budget Program levels only for each appropriation; that is, 3010-100000, 3020-210000, 3080-840000. In 3400, a training command and an operating command amount would normally be shown. In updating the financial summary information, current and prior fiscal year entries must agree with program direction and the USAF F&FP. Out-year values should correspond to the latest program budget submission or SAR.

f. Procurement:

(1) Summarize the procurement concept, types of contracts, and major contractual features to be used on the program. Include aspects of documents that establish procurement authority and otherwise govern the actions of participating procurement and production activities. Specifically, include aspects of the D&F, the Advanced Procurement Plan and subsequent changes.

(2) Summarize the requirements for industrial facilities, the use of existing Government facilities and the planned use of Government-furnished equipment, property, and services in the program.

g. Production. Summarize aspects of the Production Plan including the planning and procedures for integrating production management and engineering throughout development. This discussion should identify major production risks, their potential impact, planned resolutions, and the approach to proofing of critical production processes and equipment. Preparation for the production decision and the application of Production Readiness Review actions before DSARC milestone III should also be discussed. Clearly explain the measures for efficient transition through development to production including organizational readjustments within the program office. The measures implemented or planned to ensure effective program office/administrative contracting office (AFPRO, DCASO, NAVPRO) relationships and Government/contractor involvement in sufficient depth for efficiently monitoring the production phase should be portrayed.

h. Contractor Data. Summarize the major data requirements and concepts of data management, including technical publication management and acquisition.

i. Turnover and Transfer. Describe the approach for accomplishing turnover and transfer of the program to the operating and logistics organizations.

j. Risk Analysis. Summarize the approach for maintaining a continuous program of review and analysis to identify and evaluate program risks in the areas of technical performance, schedule, costs, operational risks, and their interrelationships.

k. Information. Identify the relationship between information officers and program officials. It should also cover:

(1) General Policy. Include guidance on release of information, internally and externally, through all media; that is, news releases, articles, speeches, symposia, technical papers, response to news media queries, and photographic and audio information materials.

(2) Information Responsibilities. List Government and contractor organizations and their responsibilities for information actions regarding coordination, clearance, and release requirements. Provide for compiling current releasable information on major aspects of the program. This guidance should be made available to all Air Force and contractor offices that would be expected to provide information to the public on the program either responding to queries or through voluntary release in any form. Especially important is information provided in Congressional statements and published testimony before Congressional committees. This is a primary source of new public information on programs.

(3) Security Review. Cross-reference the security section in providing instructions for processing materials proposed for clearance and public release.

l. Miscellaneous. All other pertinent program management information.

5. System Engineering and Configuration Management (Section 4). This section should provide a description of the overall approach to be taken in

system engineering and configuration management.

a. System Engineering Management. Describe the program effort for defining the preferred system configuration (system definition), engineering/technical management, and the integration of engineering disciplines and specialty programs. Provide a brief description of the major equipment, subsystem and critical items with the engineering design approach for acquisition. Include summaries or plans for risk reduction programs, technical reviews, and studies and analyses, particularly life cycle cost analyses, if appropriate. Major equipment and subsystems should be identified in a manner consistent with MIL-STD-881 to ensure uniformity in comparison of accomplishment and planning and for follow-on reporting or necessary revision or updating. Summarize the planned approach for engineering and engineering management, including but not limited to the following:

(1) Engineering definition of the complete system.

(2) Reliability, maintainability, nondestructive inspection, corrosion prevention, human engineering, survivability, vulnerability (including electronic warfare considerations), transportability, value engineering, quality assurance, producibility, technical performance measurement, and defense standardization program.

(3) Electromagnetic compatability and TEMPEST aspects of electronic and electrical equipment, including analysis, measurements, standards, frequency allocations and operational constraints.

(4) Computer, computer programs, and associated documentation to be used as part of the system or equipment and that necessary for support. Considerations such as capacity, environmental compatability, and requirements for functioning with other systems should be included.

(5) Briefly describe the approach in achieving a total system safety program (flight, ground, environmental, radiological, explosive, and nuclear). Include determination and identification of standardized system safety engineering tasks prescribed in MIL-STD-882 as applicable, and indicate whether the performance of these tasks is planned as contractor or in-house effort. Also state intentions regarding the information and operation of a System Safety Group (AFR 127-8).

(6) Evaluation of the natural aerospace environmental factors and the system's effects upon man's environment.

(7) Human factors, to include personnel planning information and training requirements.

(8) Aircraft Structural Integrity Program (ASIP).

(9) Biomedical. The assistance of specialized aerospace medical personnel of AFSC, the operating and the support organizations should be used to identify and review biomedical aspects of the man-machine relationship. Include known and potential biomedical problems that may be encountered during acquisition or operational use of the system.

(10) Use of standard or currently available mobility shelters. Consult with the Air Force Weapons Laboratory, Civil Engineering Division, in planning for use of currently available standard mobility shelters or in developing special types.

b. Configuration management:

(1) Describe how functions of configuration management will be accomplished through implementation of selected management techniques.

(2) Describe what management tools will be used to apply the fundamental principles of configuration management.

(a) Identification.

(b) Change control.

(c) Status accounting.

(3) To provide a basis for evaluating management effectiveness and to assist in decisionmaking, describe the management concepts for accomplishing the following configuration requirements:

(a) Organization (including configuration control board activity).

(b) Uniform specification program.

(c) Interface control.

(d) Configuration Management Plan.

6. Test and Evaluation (Section 5):

a. This section should include:

(1) The test management concept including organizational structure and responsibilities. All participating organizations should be identified.

(2) Critical issues and areas of risk.

(3) Specific test objectives.

(4) Reporting requirements.

(5) Any contractor or non-AFSC test facility that is to be used rather than a technically equivalent AFSC facility.

b. Test plans should include:

(1) Objectives and approach for Development Test and Evaluation (DT&E), including Initial Operational Test and Evaluation (IOT&E), developed in coordination with the operating and supporting commands. Include refurbishment plans applicable to the test resources (example: aircraft) used for DT&E.

(2) Participation in OT&E beyond IOT&E including plans for engineering support carried on through initial deployment of the system to an operational theater or base. Include plans for operating and supporting command participation in DT&E and other program activities as mutually determined.

c. Include test support identified by organization (Government and contractor) and location where possible. These requirements should be identified with the applicable phase and show the approximate beginning and ending dates. The following are typical support requirements:

(1) The technical and logistic support required to support the test program.

(2) Range and base support requirements such as data processing, aircraft, instrumentation, data reduction, telemetry, maintenance and checkout equipment, building/space. Reference section 6 for communications/electronics test support requirements.

(3) AFSC/scientific/industrial facilities to be used.

7. Communications/Electronics (Section 6):

a. In this section, communications/electronics requirements should be individually identified for:

(1) Program management (any special communications requirements of the Program Manager/program office).

(2) Test support.

(3) The operational system.

b. The following should be considered for each of the above categories:

(1) Quantities and types of equipment and/or capabilities such as ground radio, radar, telemetry, navigational aids, flight facilities, meteorological, crypto, CCTV, special telephone features (call director), public address, intercom, facsimile, tape recording, teletype, hot lines, special circuits, microwave, satellite, mobile-portable equipment and information on similar items that would assist in support planning.

(2) Locations where equipment/capabilities are needed and time phasing information or required operational dates where applicable.

(3) Radio frequency support required and not already approved for the locations involved.

(4) Communications security for all telecommunications integral to Air Force weapons systems or telecommunications that support their RDT&E.

8. Operations (Section 7). This section requires inputs from the operating command and should expand the operational concept for the use of the system or equipment as further formulated during the acquisition cycle. It should include information on the use and identification of the system or equipment capability it will replace or enhance. Supporting studies and documents should be cross-referenced. It should cover the following topics as appropriate:

a. Mission.

b. Limitations.

c. Deployment/Operational Plan, including ready dates.

d. Command and control.

e. Readiness (including availability and reliability).

f. Operational test and evaluation plan (including disposition of Test Articles).

g. Unit maintenance.

h. Supply and safety.

i. Meteorological/environment.

j. Electronic warfare.

k. Organization structure.

l. Transportation.

m. Personnel/manpower.

n. Training.

o. Facilities.

p. Penetration Aids.

q. Special weapons.

r. Related training and operational readiness training.

s. Electromagnetic compatibility/electromagnetic environment/site surveys.

t. Life support.

9. Civil Engineering (Section 8). Where appropriate, include or refer to a master plan prepared for each installation or subinstallation that outlines the proposed site development for the total facilities required. Categorize facilities as technical support real property (TSRP) or nontechnical support real property (NSRP).

a. Management.

(1) Indicate responsibilities and procedures for programming, design, construction, maintenance and acceptance, and transfer to the operating command of real property required. The civil engineer is responsible for all actions supporting acquisition programs.

(2) Establish procedures and responsibilities for making changes to these facilities before and after acceptance by the operating command. These responsibilities and procedures will be within existing laws and directives, many of which are peculiar to this functional area.

(3) Commitments for use of Government-owned facilities for development testing should not be included in a contract with a weapon-system contractor unless the required changes have been included in the construction program.

b. Civil engineering development:

(1) Identify, early in the system life cycle, the necessary exploratory and/or advanced development in the facilities support and substitute areas, such as mobility shelters.

(2) List all such development being programmed (or done) by project title, number, or other method of identification. The date of development and planned completion should be compatible with the requirements of the program.

c. Summarize facility support resources and Military Construction Programs (MCP) project requirement data, as follows:

(1) Indicate existing facility resources that are available to satisfy support requirements.

(2) Include a listing for each site by fiscal year showing the TSRP and NSRP (separately identified) facility deficiencies for which new construction/alternation/land is required and must be funded in the MCP (budget). Include construction category code,

program element code, and estimated scope and cost for each project.

d. When AFSC becomes the interim owner of the real property, pending installation of system equipment, describe how real property maintenance and operation will be controlled and performed between the time construction is completed and the time the system is transferred to the operating command.

10. Logistics (Section 9). This section requires inputs from the responsible logistics organization and other participating agencies. It should provide a comprehensive description of the tailored logistics concepts for the program. Include considerations supporting integrated logistics applicable to the system/equipment planning, design, development, test demonstration, and operational processes. Include logistics program planning aspects related to other elements of the PMP, supporting the varied elements of reliability, maintainability, and transportability. Include aspects related to test equipment, supply support, transportation, packaging and handling, and technical data at all levels of logistic support. The Integrated Logistic Support Plan (ILSP) and its related management information system should be consistent with this section.

11. Manpower and Organization (Section 10). Describe the organization of the program office and summarize the relationships and roles of other Air Force and Government agencies involved in the acquisition program such as laboratories, centers, and system engineering and technical direction organizations. Reference any formal agreements with participating organizations. The determination of the operational system/equipment manpower requirements is a joint effort of the program office, the operating command, other participating organizations, and the system/equipment contractors.

a. Include rationale derived from the operation and maintenance concepts and design parameters from which the manpower requirements are generated.

b. Project the requirements for officers and airmen (by grade and AFSC) and civilian totals, by fiscal year phased through the system/equipment life cycle.

c. Include organization charts and brief functional statements for the operating command units to which the system/equipment manpower will be allocated.

12. Personnel Training (Section 11). This section requires inputs from Air Training Command, operating commands, and other participating organizations. Summarize personnel training required to meet system/equipment tests and operational and support activities. Cross-reference the summary to other sections, to reflect related actions and/or authorizations. This section should include:

a. Requirements for trained personnel for the system/equipment.

b. Types, location, and key dates of individual training courses, emphasizing early planning for training courses.

c. Major items of required training equipment, and associated aerospace ground equipment, with activation schedules.

d. Major facility requirements for expansions involved in training, with activation schedules.

e. Initial and replacement training loads by fiscal quarters, projected for 5 years, if applicable.

13. Security (Section 12).

a. Security Support. In this section, the following type information should be included:

(1) Classification guidance:

(a) Provide security classification data for assigning classification categories to the various elements of the system in sufficient detail to ensure the fulfillment of security requirements from the beginning of the program life cycle.

(b) Designate the activity responsible for preparing:

1. Additional detailed security classification guidance for the system, including downgrading and declassifying schedules based on events, test/development phasing, or passage of time.

2. DD Form 254, Contract Security Classification Specification, to be furnished to bidders and contractors, and for keeping such lists current.

(2) Security review for public release of information. Provide instructions for processing requests for public release. Distinguish between information that may be:

(a) Approved for release by a designated activity within the command.

(b) Released only after being processed by the Office of the Assistant Secretary of Defense (Public Affairs).

(3) Release of information to foreign nationals, foreign governments, and international organizations. Before any information pertaining to the program is released to a foreign national, foreign government or international organization, the program manager must obtain foreign disclosure authority.

(4) Personnel security clearance or investigative requirements. Allow at least 180 days leadtime for background investigation, and 60 days leadtime for National Agency Checks, to permit required investigative actions to be completed before access to classified information.

(5) Industrial security. Include a brief outline of the specific actions required to fulfill the responsibilities for industrial security. Give attention to items such as the development of special security requirements, statements of intercommand or contractor agreements to be effected, and whether security

requirements are or will apply to industrial facilities (contractors).

b. System security. An objective of USAF physical security policy as related to development and acquisition of aerospace systems is to assure the concurrent development of system/equipment defenses against all projected forms of ground threats, overt and covert. This section should include information concerning the following in those programs where system security requirements have been identified.

(1) Design influence. Briefly describe:

(a) Physical security requirements that will be incorporated into the program requirements baseline and technically defined in the system/equipment specification.

(b) Provisions for analyses to provide system security based upon the vulnerability of the system in its ground based operational mode.

(c) Planned analyses that should provide a basis for trade studies between system design and security operational procedures to select the design approach for implementing the operational physical security arrangement.

(d) Physical security vulnerabilities that will be avoided by engineering and design and/or those where action will be taken to provide effective countermeasures.

(2) Operational security system requirements:

(a) Countermeasures proposed in response to residual vulnerabilities not amenable to correction by the engineering and design process should be identified. Proposed R&D tasks should be identified.

(b) Security oriented subsystem configuration items; for example, make or buy security hardware, software, security police personnel subsystem requirements, facilities, and logistic support together with procedural requirements devised specifically to enhance the physical security system arrangement that contribute to total system cost and operational effectiveness should be identified.

(c) OPSEC. Actions taken to prevent disclosure of all information that could be used as intelligence indicators by hostile collectors to degrade current or future activities or operations.

(d) COMSEC. Include degree of protection necessary for security of transmitted data and type of information transmitted.

14. Application of Directives (Section 13). This section should consist of the list of directives selected by the Program Manager for application, wholly or in part, to the program. The Program Manager should review the PMD and AFSC Form 56 and any other special considerations in determining applicable directives. There are many directives that may require action by the program office in managing a program. The Program Manager is responsible for determining those applying to his program and requesting waivers for those he will not apply when the directive applicability is not optional. Many directives have DOD or statutory origins and cannot be waived within the Air Force. Before approving his PMP, the Program Manager should ensure that requests for waivers are submitted through the appropriate field command OPR channels when required.

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